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EXAMINER

DOLAN, JENNIFER M

ART UNIT	PAPER NUMBER
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2652

DATE MAILED: 02/28/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/442,671

Applicant(s)

HAFTEK, ELZBIETA JANINA

Examiner

Jennifer M. Dolan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9. 6) ☐ Other:

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 21 recites the limitation "the bottom magnetic layer". There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 1, 5, 6, 9, 11, 12, and 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,734,533 to Nepela.

Regarding claim 1, Nepela discloses a magnetic transducer device (title). The device comprises a bottom magnetic pole (P1), a nonmagnetic gap layer (14) deposited over the bottom magnetic pole (figure 1); and a top magnetic pole (P2) deposited over the nonmagnetic gap layer (figure 1). The top magnetic pole has an upper portion and a lower portion, wherein the lower portion of the top magnetic pole faces the surface of the bottom magnetic pole (figure 1). The lower portion has a middle section (37) that is separated from the bottom pole by the nonmagnetic gap layer by a first distance (Tc), and the lower portion has end portions (16, 18) located at each end of the middle portion that are separated from the bottom pole by a nonmagnetic gap layer (figure 2) by a second distance (Ts). Nepela further teaches that the second distance is essentially greater than 25% of the first distance (column 4, lines 1-5).

Regarding claim 5, Nepela discloses that the second distance is essentially greater than 25% of the first distance (column 4, lines 1-5).

Regarding claim 6, Nepela teaches that the width measured between a left and a right side of the top magnetic pole ranges from approximately 1.08 to 6.5 microns (column 3, lines 57-60), which overlaps with the range of 0.3 to 1.5 microns.

Regarding claim 9, Nepela discloses a first distance of about 0.2 microns (column 4, lines 1-2).

Regarding claim 11, Nepela discloses that the end portions each have a surface that is substantially parallel with the surface of the bottom magnetic pole (figure 1).

Regarding claim 12, Nepela discloses that the end portions are substantially square in shape (figure 2).

Regarding claim 16, Nepela discloses that each end portion is defined by a segment connecting two points (figure 2).

Regarding claim 17, Nepela discloses that the segment is linear (figure 2).

Regarding claim 18, Nepela discloses a curvilinear segment (column 4, lines 23-26).

6. Claims 1-4 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,315,469 to McNeil.

Regarding claim 1, McNeil discloses a magnetic transducer device (title). The device comprises a bottom magnetic pole (112); a nonmagnetic gap layer (116) deposited over the bottom magnetic pole (figure 4); and a top magnetic pole (114) deposited over the nonmagnetic gap layer (figure 4). The top magnetic pole has an upper portion and a lower portion, wherein

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the lower portion of the top magnetic pole faces a surface of the bottom magnetic pole (figure 4). The lower portion has a middle section that is separated from the bottom pole by the nonmagnetic gap layer by a first distance (thickness of 116 in figure 4), and end portions located at each end of the middle portion that are separated from the bottom portion by a second distance (thickness of 116 in figure 4) wherein the second distance is equal to the first distance (figure 4), which means that the second distance is greater than 25% of the first distance.

Regarding claims 2-4, McNeil discloses that the second distance 100% of the first distance (figure 4). Thus, the second distance is at least 40%, 50%, and 60% of the first distance.

Regarding claim 13, McNeil discloses that the end portions are wedged in shape (figure 4).

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-4, 7, 8, 10, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nepela.

Regarding claims 2-4, Nepela discloses an exemplary embodiment of the head, with dimensions such that the second distance of the gap layer is approximately equal to 25% of the first distance (column 4, lines 1-5). Nepela's invention is not, however, limited to the

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dimensions of the exemplary embodiment. Assuming arguendo, the second distance of Nepela is not at least 40%, 50%, or 60% of the first distance.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the dimension of the second distance of the gap layer, of Nepela, such that it is at least 40%, 50%, or 60% of the first distance. The rationale is as follows: Nepela teaches that the second distance is selected such that the magnetic field delivered to an adjacent magnetic medium meets various performance criteria (column 4, lines 57-61). One of ordinary skill in the art would have been motivated to optimize the second distance such that the magnetic field and magnetic flux delivered to a recording medium are restricted to desirable values. Thus, it would have been obvious to specify that the second distance is at least 40%, 50%, or 60% of the first distance, so that the magnetic field properties delivered to an adjacent recording medium are optimized.

Regarding claim 7, Nepela discloses that an exemplary value of the width of the device is approximately 1 micron (column 3, lines 57-60), but fails to teach all considered ranges of width for this device. Assuming arguendo, the width of Nepela is not in the range of 0.3 to 0.5 microns.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify a width of 0.3 to 0.5 microns for the magnetic head of Nepela. The rationale is as follows: It is well known in the art that track density increases as the width of the pole tip decreases. It is likewise well known in the art that as the width of the pole tip decreases, fringe fields, which increase side writing, as well as pulse asymmetry, become more pronounced. It is well within the purview of one of ordinary skill in the art to select values for the width of the pole tip such that the track width is as small as possible, while maintaining the fringe field effects

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within reasonable parameters. Thus, one of ordinary skill in the art would be motivated to specify a width of approximately 0.3 to 0.5 microns in order to optimize the track width and fringe field effects of the device.

Regarding claim 8, Nepela discloses in an exemplary embodiment that the first distance is about 20% of the width of the device (column 4, line 2 and column 3, lines 57-60), but fails to disclose all of the ranges of dimensions for the features of this device. The device of Nepela is considered to have dimensional ranges such that the first distance is about 30% of the width. Assuming *arguendo*, the first distance of Nepela is not about 30% of the width of the device.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the first distance is about 30% of the width of Nepela's device. The motivation for this is as follows: In a thin film head, the first distance, which corresponds to the write gap, is selected to control the strength of the magnetic field between the poles, and is typically about 0.2 microns. The width of the device, as explained above in the treatment of claim 7, is selected to optimize track width and fringe field effects. Although Nepela discloses a width of about 1 micron (column 3, lines 57-60), it is clear that a smaller width could be specified. Thus, it would have been obvious to specify a width such that the first distance is about 30% of the width, in order to optimize the track width and fringe field effects of the device.

Regarding claim 10, Nepela discloses in an exemplary embodiment that the first distance of the gap layer is 0.2 microns (column 4, lines 1-2), but fails to disclose the range of thickness for the first distance considered in this device. Nepela's device is considered to also include a



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first distance of 0.15 microns. Assuming arguendo, Nepela's device does not have a width in the range of 0.1 to 0.15 microns.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify a first distance in the range of 0.1 to 0.15 microns for the device of Nepela. The rationale is as follows: A decrease in the first distance leads to an increase in the magnetic field delivered to the recording medium. In order to record on the magnetic medium, the field delivered to the recording medium must be greater than the coercivity of the recording medium (column 4, lines 6-15). Thus, it would have been obvious to one of ordinary skill in the art to select a first distance in the range of 0.1 to 0.15 microns, such that the magnetic field delivered is sufficient to record transitions on the recording medium.

Regarding claims 19 and 20, Nepela discloses that the end regions have an arcuate configuration (column 4, lines 23-26), but does not specifically disclose whether the arcuate configuration is convex or concave with respect to the bottom magnetic pole.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the arcuate configuration of Nepela constitutes both convex and concave configurations. The motivation is as follows: An arcuate configuration of the end gap implicitly means that a segment drawn along the end region would be either convex or concave with respect to the bottom magnetic pole. Because Nepela teaches that a single step, multiple steps, or arcuate configurations for the end regions are art equivalents and may alternately be used (column 4, lines 23-26), it is clear that both the convex and concave arcuate configurations are considered art equivalents to the single step end region. Thus, it is well within the purview of

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one of ordinary skill in the art to select both the convex and concave configurations for the end regions.

9. Claims 1, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,163, 436 to Sasaki et al.

Regarding claim 1, Sasaki discloses a magnetic transducer (title) comprising: a bottom magnetic pole (27), a nonmagnetic gap layer (28) deposited over the bottom magnetic pole (abstract, lines 5-7), and a top magnetic pole (36) deposited over the nonmagnetic gap layer (figures 26a, 26b). The top magnetic pole has an upper portion and a lower portion, wherein the lower portion of the top magnetic pole faces a surface of the bottom magnetic pole (figure 26a) and wherein the lower portion has a middle section (center region in figure 26a) that is separated from the bottom pole by the nonmagnetic gap layer by a first distance and the lower portion has end portions located at each end of the middle portion (side regions in figure 26a) that are separated from the bottom pole by the nonmagnetic gap layer by a second distance. In figure 26a, the second distance is considered to be approximately 40% of the first distance, but Sasaki does not disclose the exact dimensions. Assuming *arguendo*, the second distance is not at least 25% of the first distance.

It would have been obvious to one of ordinary skill at the time the invention was made to modify the transducer of Sasaki such that the second distance is at least 25% of the first distance. The rationale is as follows: One of ordinary skill in the art would have been motivated to specify a second distance such that the track width is as narrow as possible and the magnetic flux delivered to the surface is larger than the magnetic coercivity of the recording medium. The first

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distance must be made large enough to accommodate the thin film coils of the magnetic head. Thus, it would have been obvious to specify that the second distance is at least 25% of the first distance, such that the first distance allows for the placement of the coils and the second distance optimizes the track width and recording properties.

Regarding claim 14, Sasaki teaches that the end portions have a surface that faces the surface of the bottom magnetic pole (figure 26a) wherein the surface of the end portions is angled so that at one end of the end portion (left-central portion of figure 26a) the distance between the end portion and the bottom magnetic pole is greater than at an opposite end of the end portion (left portion of figure 26a).

Regarding claim 15, Sasaki teaches that the distance is greatest between the end portions (36) and the bottom magnetic pole (27) at the end portion closest to the middle portion (left-central portion of figure 26a) of the top magnetic pole.

10. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nepela in view of U.S. Patent No. 6,169,642 to Mino et al.

Nepela fails to disclose that the bottom magnetic layer (P1) comprises a shared pole, a magnetic layer deposited on the shared pole wherein the magnetic layer has a width equal to the width of the device, and a nonmagnetic region deposited on the shared pole at each end of the magnetic region.

Mino et al. teach that the bottom magnetic layer comprises a shared pole (column 10, lines 6-11), a magnetic layer (44) deposited on the shared pole (figure 4), and a nonmagnetic

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layer (47) deposited on the shared pole (figure 4) at each end of the magnetic region. The width of the magnetic layer is clearly equal to the width of the top of the top pole (48), which is considered to be the width of the device.

It would have been obvious to one of ordinary skill at the time the invention was made to modify the magnetic transducer of Nepela to include the bottom magnetic layer structure taught by Mino et al. The modification would have been obvious because Mino et al. teach that it increases heat dispersion from the coil conductor, which prevents generation of heat from a magnetic head (Mino, column 3, lines 15-24)

### *Conclusion*

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,072,670 to Furuichi et al. discloses an alternate means of reshaping the top pole tip to prevent side-fringing.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (703) 305-3233. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and same for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Jennifer M. Dolan  
Examiner  
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jmd  
February 21, 2002



**DAVID DAVIS**  
**PRIMARY EXAMINER**